

100/10Mbps N-Way Switch

USER'S GUIDE

For Products:

Thirty-two (32) port 100/10Mbps N-Way Switch w/ two (2) fiber ports

Thirty-two (32) port 100/10Mbps N-Way Switch w/ one (1) fiber port

Thirty-two (32) port 100/10Mbps N-Way Switch

Twenty-four (24) port 100/10Mbps N-Way Switch w/ two (2) fiber ports

Twenty-four (24) port 100/10Mbps N-Way Switch w/ one(1) fiber port

Twenty-four (24) port 100/10Mbps N-Way Switch

NOTICE ON WORDING

FCC WARNING

This equipment has been tested and found to comply with the limits for a Class A computing device pursuant to Part 15 of FCC Rules, which are designed to provide reasonable protection against electromagnetic interference in a commercial environment.

Changes or modifications to the equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

CE MARK WARNING

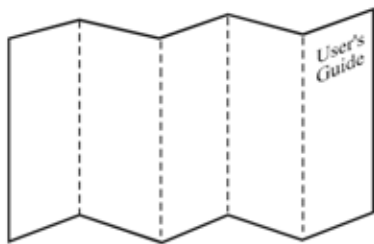
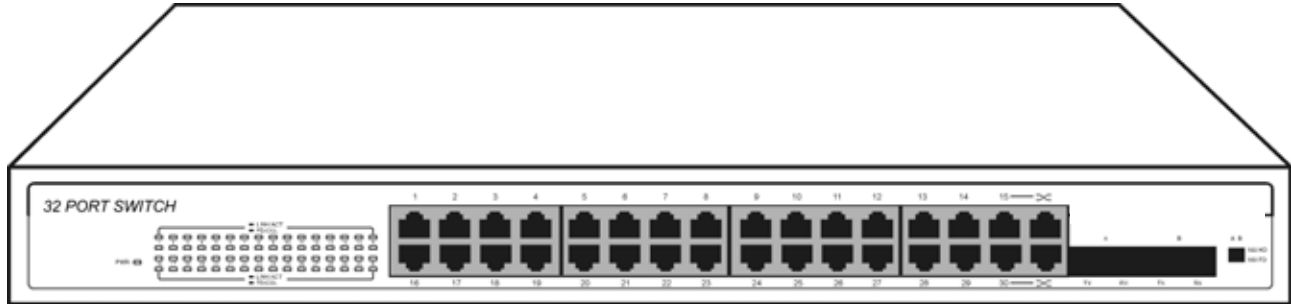
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

1. UNPACKING INFORMATION

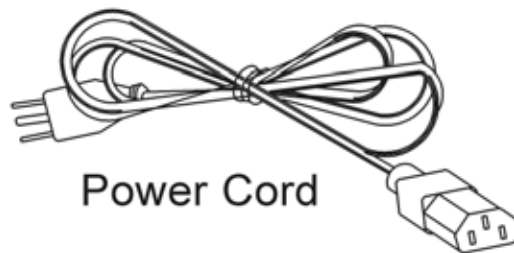
Thank you for purchasing this Switch. Before continuing, please check the contents of the product package. This product package should contain the following items:

- One (1) Switch
- One (1) Power Cord
- Four (4) Rubber Feet (for desktop placement)
- One (1) Rackmount Kit
- This User's Guide

If anything is missing, please contact your place of purchase.



User's Guide



Power Cord



Feet



Rackmount Kit

2. PRODUCT INTRODUCTION

Models

These Switches are multi-speed, versatile network devices combining both standard and "Big-Pipe" ports under the same hood.

The number and types of ports for these Switches are listed below.

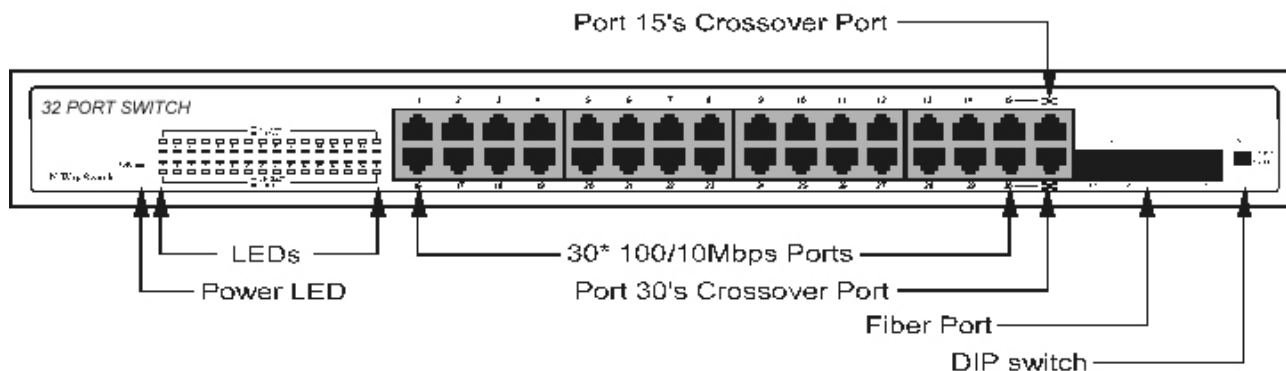
Model	100BASE-TX / 10BASE-T ports	100BASE-FX ports
30 ports 100BASE-TX + 2 ports 100BASE-FX Smart Switch	Thirty (30)	Two (2)
31 ports 100BASE-TX + 1 port 100BASE-FX Smart Switch	Thirty-one (31)	One (1)
32 ports 100BASE-TX Smart Switch	Thirty-two (32)	N/A
22 ports 100BASE-TX + 2 ports 100BASE-FX Smart Switch	Twenty-two (22)	Two (2)
23 ports 100BASE-TX + 1 port 100BASE-FX Smart Switch	Twenty-three (23)	One (1)
24 ports 100BASE-TX Smart Switch	Twenty-four (24)	N/A

KEY FEATURES

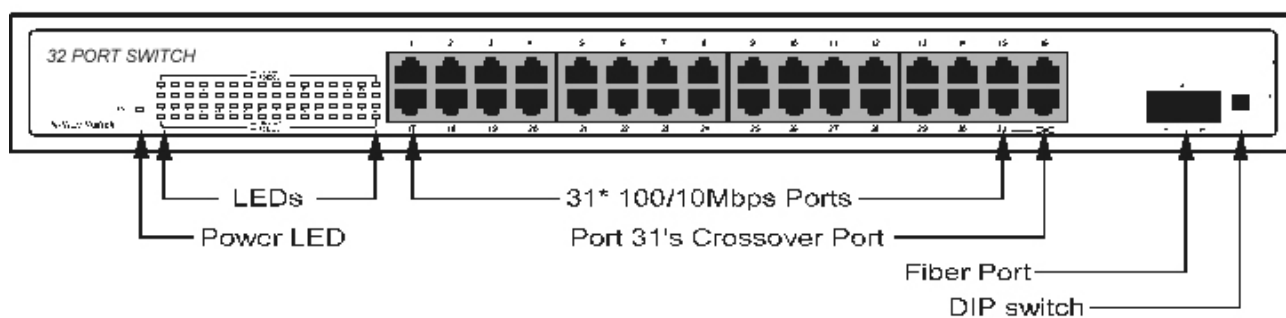
- Independent bandwidth for each port
- 100/10Mbps TP ports with Auto-Negotiation support
- Bridging capability for 100Mbps and 10Mbps segments
- Store and Forward technology
- Built-in Crossover port
- IEEE 802.3x flow control support for Full-Duplex operation
- Back-pressure support for Half-Duplex operation
- 8 Mbyte Buffer Memory (30 PORTS 100BASE-TX + 2 PORTS 100BASE-FX SMART SWITCH/3201/3200)
- 6 Mbyte Buffer Memory (22 PORTS 100BASE-TX + 2 PORTS 100BASE-FX SMART SWITCH/2401/2400)
- 1031 6-Byte MAC Address Table
- Two (2) 100BASE-FX fiber ports (30 PORTS 100BASE-TX + 2 PORTS 100BASE-FX SMART SWITCH, 22 PORTS 100BASE-TX + 2 PORTS 100BASE-FX SMART SWITCH)
- One (1) 100BASE-FX fiber port (31 PORTS 100BASE-TX + 1 PORT 100BASE-FX SMART SWITCH, 23 PORTS 100BASE-TX + 1 PORT 100BASE-FX SMART SWITCH)
- Rack mounting capability

The Front Panel

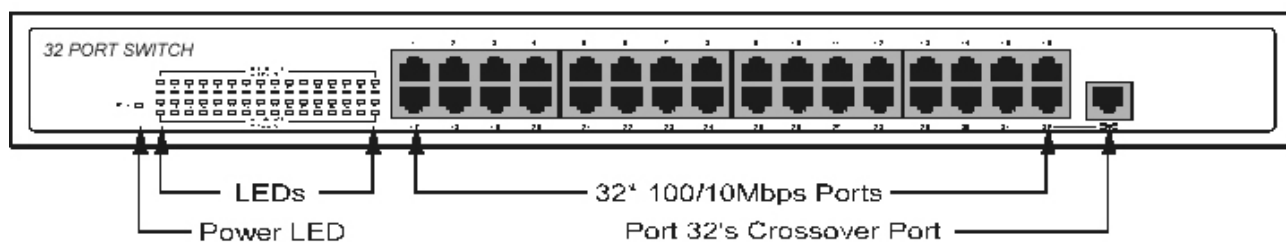
Thirty-two (32) port 100/10Mbps N-Way Switch w/ two (2) fiber ports



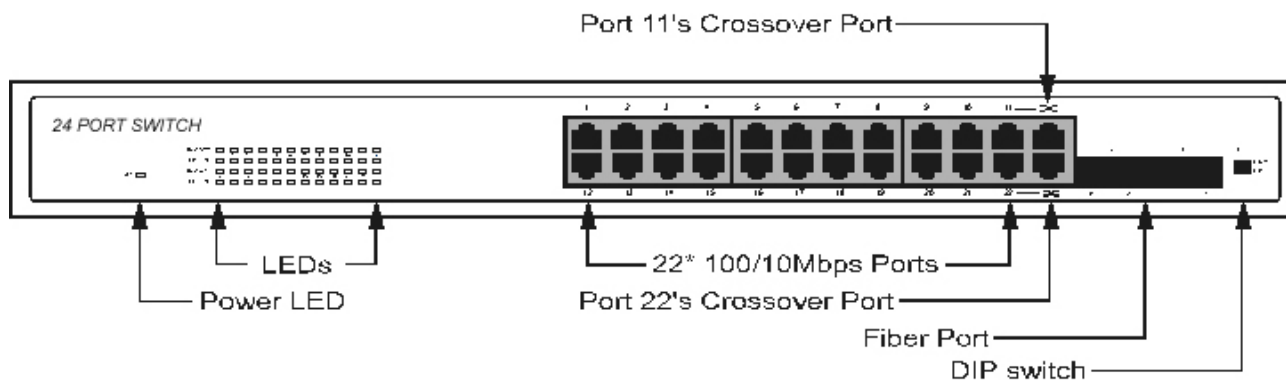
Thirty-two (32) port 100/10Mbps N-Way Switch w/ one (1) fiber port



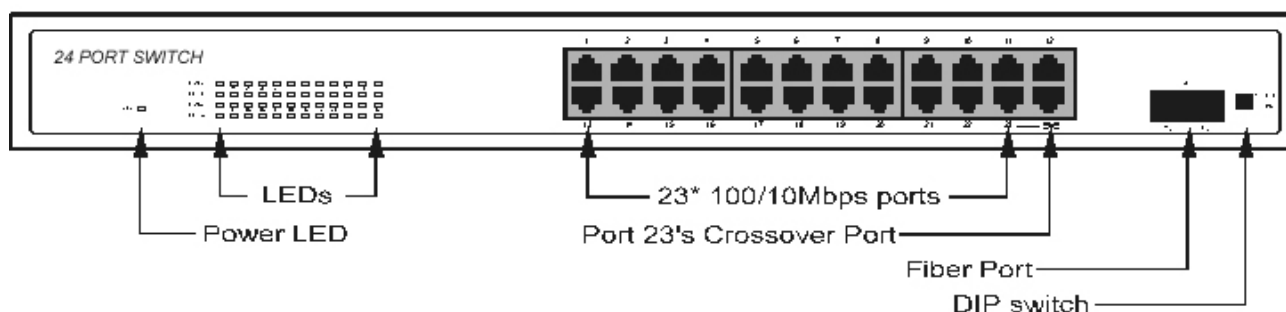
Thirty-two (32) port 100/10Mbps N-Way Switch



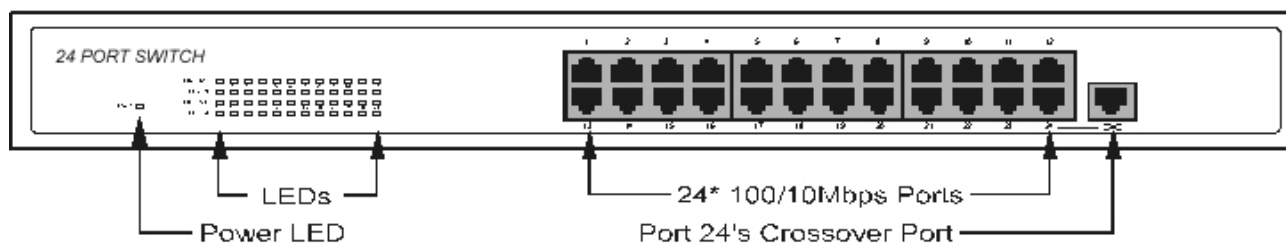
Twenty-four (24) port 100/10Mbps N-Way Switch w/ two (2) fiber ports



Twenty-four (24) port 100/10Mbps N-Way Switch w/ one(1) fiber port



Twenty-four (24) port 100/10Mbps N-Way Switch



Port Speeds

100/10Mbps TP Ports

Each 100/10Mbps TP port provides an Auto-Negotiation function that senses for the attached device's maximum operating speed and automatically sets the Switch to operate at that speed. Each TP port uses RJ-45 connectors that allow network TP cables to be easily attached or removed. Users only need to connect a network device into any TP port and the Switch will do the rest.

100BASE-FX Fiber Port (Models with Fiber port, only):

100BASE-FX is primarily used for network backbones. The Fiber ports come with an SC connector for attaching multi-mode optical fiber cables. A DIP switch is provided on the front panel for each fiber port so users can manually set the 100BASE-FX port to operate in Half-Duplex (default), or *forced* Full-Duplex mode.

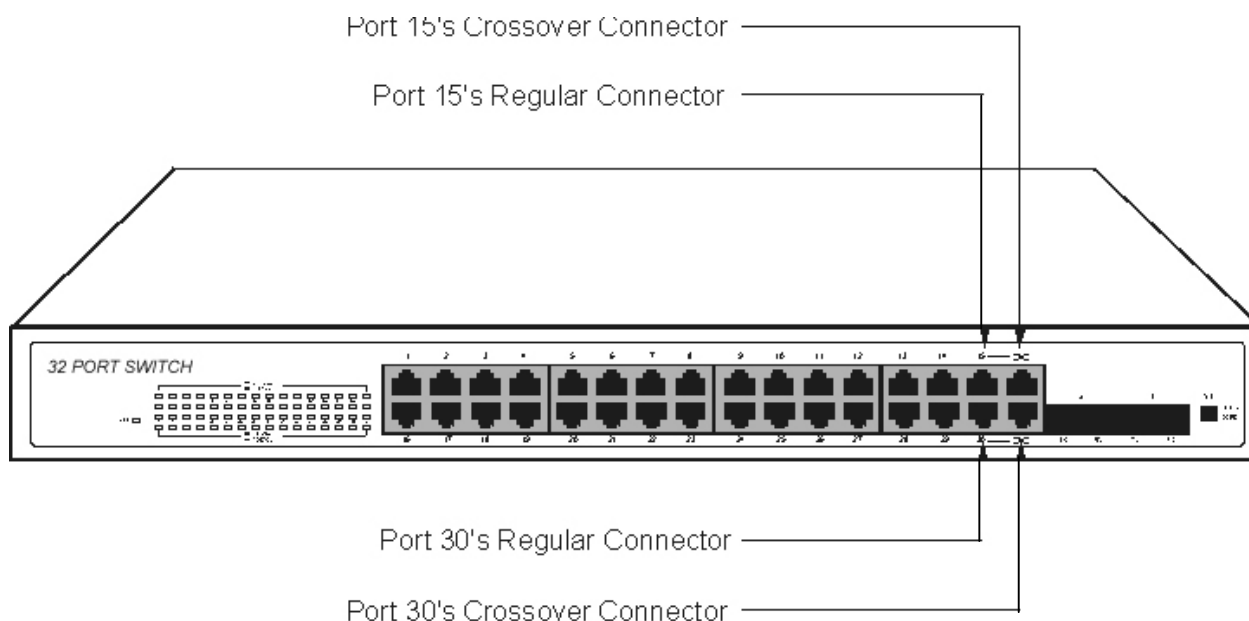
DIP Switch (Models with Fiber port, only)

The Table below lists the 100BASE-FX Port DIP Switch Settings:

DIP Switch in "Up" Position	DIP Switch in "Down" Position
100Mbps Half-Duplex	100Mbps Full-Duplex

Crossover Connector

Each model supports a Crossover function. The Crossover function is used for Uplinking to a standard port on another Hub using normal TP cable.



- **Warning:** You cannot use the **Crossover connector** and the attached **regular connector** at the same time.

Cabling

10Mbps – Category 3, 4, or 5 TP cabling can be used for transmitting data at 10Mbps or 20Mbps on 10BASE-T networks.

100Mbps – Only Category 5 TP cabling can be used for transmitting data at 100Mbps or 200Mbps on 100BASE-TX networks.

Port Type	Cable Type	Connector
10BASE-T	Category 3, 4 or 5 TP	RJ-45
100BASE-TX	Cat. 5 TP	RJ-45
100BASE-FX	62.5/125 μ m multimode fiber cable	SC

- **Note:** Category 5 TP cable should be used *whenever* installing new TP cabling.

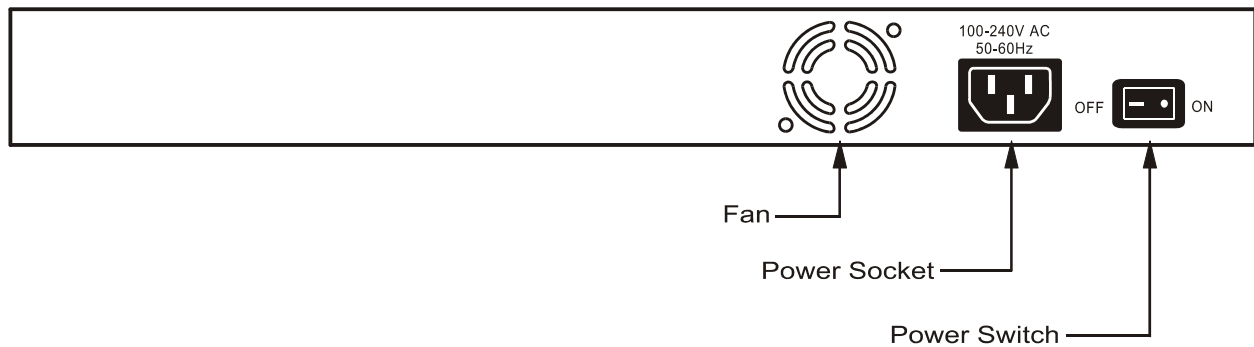
Status LEDs

These Switches come with a complete range of LEDs. The table below lists each LEDs name, color and a brief description of its function.

- One (1) for power On/Off
- One (1) per port for Link/Activity
- One (1) per port for Full-Duplex/Collision

NAME	COLOR	FUNCTION
POWER (PWR)	Green	● Lit: Power "On" ● Unlit: Power "Off"
LINK/ACT	Green	● Lit: When the port has a valid physical connection (Link) with another device. ● Blinks: When the port is sending or receiving data (Activity).
FD/COL	Amber	● Lit: When port is set to Full-Duplex mode. ● Blinks: When a collision is detected, when the port is in Half-Duplex mode.

The Rear Panel



On/Off ("Reset") Switch

The power On/Off switch is located on the far right of the rear panel - next to the power connector.

To Reset the Switch, turn the power switch "Off," then "On."

- **Note:** The Switch must be reset when the MAC address table needs to be rebuilt.

Power Socket

The Power Socket is designed to be used with the power cord included in the product package.

- Attach the female end of the cord to the power connector on the back panel.
- Attach the male end of the cord to a grounded power outlet.

Fan

- **Important:** Please keep the fan area clear, so that the cooling function is not impaired.

3. INSTALLATION

Every model is "Plug & Play." They do NOT require software configuration. Users can immediately use any of the features of this product simply by attaching the cables and turning on the power.

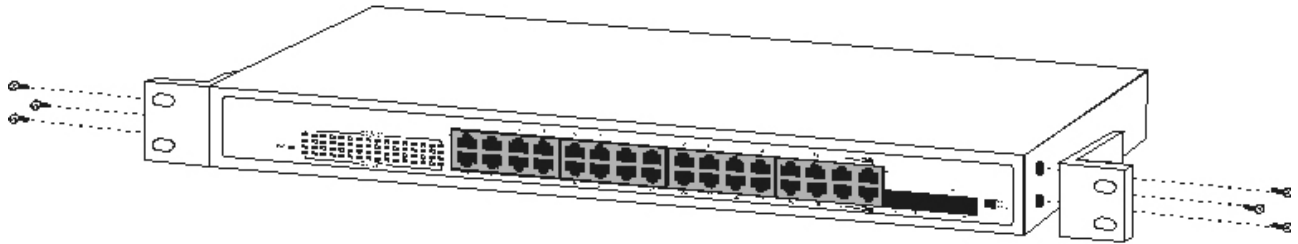
To Locate The Switch On A Desktop,

- Attach the four (4) rubber feet included in the product package to the bottom of the Switch, one in each corner.
- Place the Switch on a clean, flat desk or table top close to a power outlet.
- Plug in all network connections and the power cord
- Turn the power switch to "On."

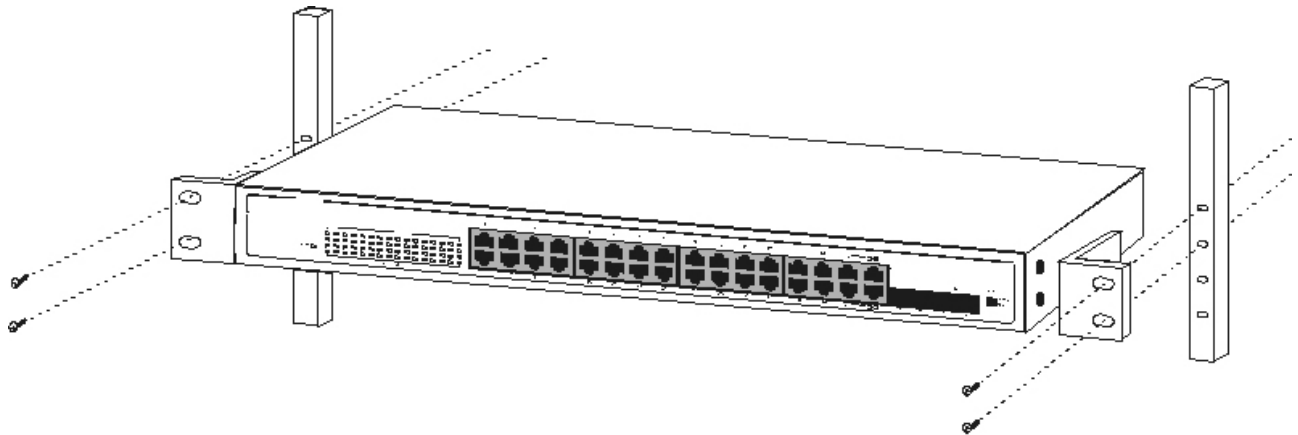
Rackmount Placement

These Switches can be mounted in an EIA standard-sized 19-inch rack.

1. Attach one (1) rackmounting bracket on each side of the Switch's front panel with the provided screws.



2. Use the other provided screws to secure each Switch to the rack.



4. HELPFUL SUGGESTIONS

Prior to Installation

Before installing these Switches and connecting network devices, it is important to plan the network's layout. Things you should consider include:

- **Dedicated Bandwidth:** File servers and other high-traffic hardware improve their performance if they have their own dedicated 10Mbps or 100Mbps bandwidth.
- **Full-Duplex:** Determine which devices support Full-Duplex connections.
- **Fast Ethernet:** Make sure rules for cable lengths and categories are followed. 100BASE-TX and 100BASE-FX have different rules for cable and distance.
- **Auto-Negotiation:** Devices with different speeds may be easily swapped when the other end of the cable is fixed to a port with Auto-Negotiation.
- **Crossover Uplink:** These Switches can be Uplinked to another Hub using the Crossover function.
- Remember - If you are using the last TP port's Crossover port, you cannot use the last TP port's regular port. If you use both of the last port's ports at the same time your Hub will not operate properly.

Half- and Full-Duplex

These Switches support both Half- and Full-Duplex modes for 10BASE-T and 100BASE-TX.

- In Half-Duplex mode data cannot be transmitted and received at the same time. Attached devices must finish transmitting data before they can receive data.
- In Full-Duplex mode data can be transmitted and received at the same time.

However:

- a) Full-Duplex transmission is only possible between two devices with a dedicated link (e.g., Switch-Switch, Switch-PC)
- b) Both devices must have Full-Duplex capability
- c) Both devices must be set to Full-Duplex (e.g. Auto-Negotiation – Auto-Negotiation, Non-Auto-Negotiation to Non-Auto-Negotiation)
- The 100BASE-TX/10BASE-T ports on these Switches detect and set the line's operating mode by using their Auto-Negotiation function.

Fast Ethernet

100BASE-TX is called "Fast Ethernet." In Fast Ethernet (100Mbps) data travels ten times faster than in traditional Ethernet (10Mbps).

Below is a list of the cable types and connectors supported by the Switch for 10BASE-T and 100BASE-TX networks.

Port Type	Cable Type	Connector
10BASE-T	Category 3, 4 or 5 TP	RJ-45
100BASE-TX	Cat. 5 TP	RJ-45

- **Note:** If your 10BASE-T network currently uses Cat. 5 TP cabling, you can instantly upgrade the network to a 100BASE-TX network by changing network devices.

Auto-Negotiation

Every 100/10Mbps dual speed port on these Switches has a built-in "Auto-Negotiation" function. This technology automatically sets the best possible bandwidth as soon as a connection is established with another network device (usually at Power "On" or Reset). This capability is achieved via the Switches Auto-Negotiation function that automatically detects the modes and speeds the second (attached) device is capable of.

Evaluating Auto-Negotiation Capability:

If the attached device is:	The Switch Will Automatically Set Its TP Ports to Operate At:
100Mbps, no Auto-Negotiation	100Mbps Bandwidth (100BASE-TX, Half-Duplex)
100Mbps, with Auto-Negotiation	200Mbps Bandwidth (100BASE-TX, Full-Duplex)
10Mbps, no Auto-Negotiation	10Mbps Bandwidth (10BASE-T, Half-Duplex)
10Mbps, with Auto-Negotiation	20Mbps Bandwidth (10BASE-T, Full-Duplex)

- **Helpful Warning:** If the attached device is set to a fixed mode (ex: Forced Full-Duplex) it will not operate as an Auto-Negotiation device.

MAC Address Table

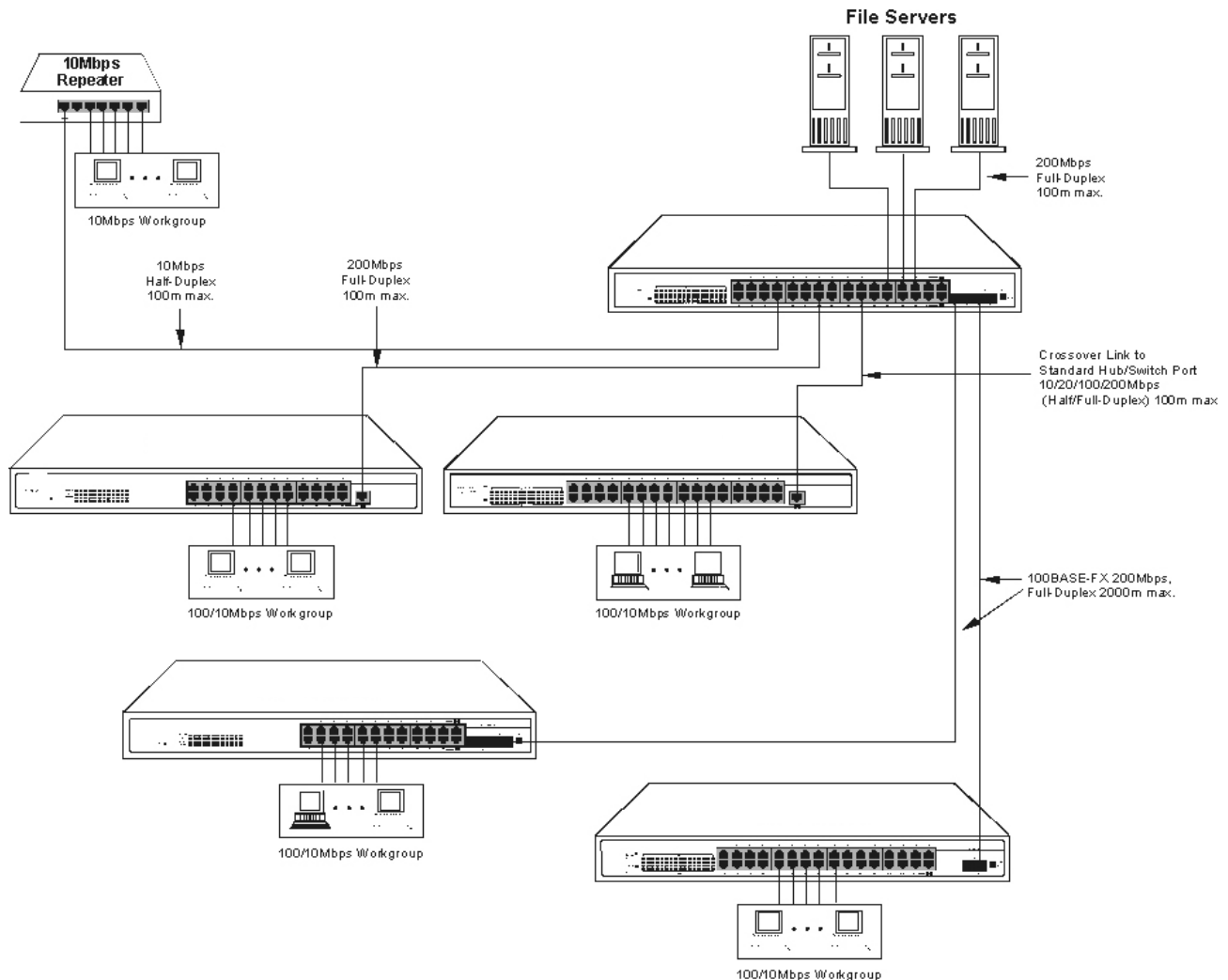
Every Ethernet data packet includes both source and destination addresses. This 6-byte ID is called the MAC (Media Access Control) Address.

These Switches can automatically learn and store MAC addresses. However, the MAC address table is volatile: it disappears when the Switch is powered "Off" or reset.

Note: When the network needs reconfiguration, we recommend turning off the power first. After all nodes have been moved, turn the Switch back "On" to rebuild the internal MAC address table.

5. SAMPLE APPLICATION

The optimal application for these Switches is as a "big pipe" backbone interconnecting file servers with bandwidth-hungry workgroups, departments, and offices.



6. TROUBLESHOOTING

I. Link LED does not lit after cable is connected to the port.

- Verify that the other end of the cable is connected to a device that is powered on and on-line.
- For TP cable connection to another hub, verify that only one end of the cable is connected to a "Crossover" port.

II. 100BASE-TX port Link LED is lit, Collision LED is blinking, but traffic is irregular.

- Check that the attached device is not set to dedicated Full-Duplex. (Some devices use a physical or software switch to change Duplex modes. Auto-Negotiation may not recognize this type of Full-Duplex setting).

- **Remember:** For any change to DIP switch settings to take effect, the PowerSWITCH must be turned "Off", then "On" again.

ALWAYS CHECK THAT:

- Cable and link distances are within the network's specifications

- Overall network diameters are within the network's specifications
- You are not using the **Crossover connector** and the attached **regular connector** at the same time.

7. PRODUCT SPECIFICATIONS

Models	32 PORTS 100BASE-TX SMART SWITCH	31 PORTS 100BASE-TX + 1 PORT 100BASE-FX SMART SWITCH	30 PORTS 100BASE-TX + 2 PORTS 100BASE-FX SMART SWITCH
Standards	10BASE-T IEEE 802.3 100BASE-TX IEEE 802.3u - IEEE 802.3x Flow Control for Full-Duplex operation		
Ports	Thirty-two (32) 100BASE-TX/10BASE-T	- Thirty-one (31) 100BASE-TX/10BASE-T - One (1) 100BASE-FX -	- Thirty (30) 100BASE-TX/10BASE-T - Two (2) 100BASE-FX -
Media Support	10BASE-T Category 3, 4 or 5 TP 100BASE-TX Category 5 TP	10BASE-T Category 3, 4 or 5 TP 100BASE-TX Category 5 TP 100BASE-FX 62.5/125 μm multimode fiber cable	
Bandwidth	100BASE-TX - 200/100 10BASE-T - 20/10Mbps	100BASE-TX - 200/100Mbps 100BASE-FX - 200/100Mbps 10BASE-T - 20/10Mbps	
Forwarding/Filtering Rate	148,800 packets/second per port @ 100Mbps, max. 14,880 packets/second per port @ 10Mbps, max.		
Latency	11 μsec @100Mbps, minimum 75 μsec @ 10Mbps, minimum		
MAC Addresses	1,031 six (6)-byte entries maximum, self-learning		
Buffer Memory	8 Mbyte		
Duplex Modes	TP ports have 100/10Mbps Full/Half-Duplex Auto-Negotiation function	- TP ports have 100/10Mbps Full/Half-Duplex Auto-Negotiation - Fiber ports set to Half or Forced Full-Duplex mode via a DIP switch	
Crossover	Port 32 has an extra connector that supports a Crossover function	Port 31 has an extra connector that supports a Crossover function	Ports 15 & 30 each have an extra connector for Crossover functions
Switches	One (1) for Power	- One (1) for Power - One (1) to set Fiber port to Half- or Full-Duplex	- One (1) for Power - Two (2) to set Fiber ports to Half- or Full-Duplex
LED Indicators	- One (1) for Power - One (1) per port for Link / ACT	One (1) per port for Full-Duplex /Collision	
Power Supply	Internal full range auto-switching	Input voltage: 100 ~ 240 +/-10% VAC/ 50 ~ 60 Hz	
Power Consumption	36.4 watt max.		
Environment	- Operating Temp: 0° ~ 45°C (32° ~ 113°F) - Storage Temp : -20° ~ 70°C (-4° ~ 158°F) - Humidity : 10% ~ 90% non-condensing		
Dimensions	442 x 185 x 44 mm (17.40 x 7.28 x 1.73 inches)		

Models	24 PORTS 100BASE-TX SMART SWITCH	23 PORTS 100BASE-TX + 1 PORT 100BASE-FX SMART SWITCH	22 PORTS 100BASE-TX + 2 PORTS 100BASE-FX SMART SWITCH
Standards	10BASE-T IEEE 802.3 100BASE-TX IEEE 802.3u - IEEE 802.3x Flow Control for Full-Duplex operation		
Ports	Twenty-four (24) 100BASE-TX/10BASE-T	- Twenty-three (23) 100BASE-TX/10BASE-T - One (1) 100BASE-FX	- Twenty-two (22) 100BASE-TX/10BASE-T - Two (2) 100BASE-FX
Media Support	10BASE-T Category 3, 4 or 5 TP 100BASE-TX Category 5 TP	10BASE-T Category 3, 4 or 5 TP 100BASE-TX Category 5 TP 100BASE-FX 62.5/125 μm multimode fiber cable	

Bandwidth	100BASE-TX - 200/100Mbps 10BASE-T - 20/10Mbps	100BASE-TX - 200/100/20/10Mbps 100BASE-FX - 200/100Mbps 10BASE-T - 20/10Mbps
Forwarding/Filtering Rate	148,800 packets/second per port @ 100Mbps, max. 14,880 packets/second per port @ 10Mbps, max.	
Latency	11 µsec @100Mbps, minimum 75 µsec @ 10Mbps, minimum	
MAC Addresses	1,031 six (6)-byte entries maximum, self-learning	
Buffer Memory	6 Mbyte	
Duplex Modes	TP ports have 100/10Mbps Full/Half-Duplex Auto-Negotiation function	- TP ports have 100/10Mbps Full/Half-Duplex Auto-Negotiation - Fiber ports set to Half or Forced Full-Duplex mode via a DIP switch
Crossover	Port 24 has an extra connector that supports a Crossover function	- Port 23 has an extra connector that supports a Crossover function - Ports 11 & 22 each have an extra connector for Crossover functions
Switches	One (1) for Power	- One (1) for Power - One (1) to set Fiber port to Half- or Full-Duplex - Two (2) to set Fiber ports to Half- or Full-Duplex
LED Indicators	- One (1) for Power - One (1) per port for Link / ACT	One (1) per port for Full-Duplex /Collision
Power Supply	Internal full range auto-switching	Input voltage: 100 ~ 240 +/-10% VAC/ 50 ~ 60 Hz
Power Consumption	36.4 watt max.	
Environment	- Operating Temp: 0° ~ 45°C (32° ~ 113°F) - Storage Temp : -20° ~ 70°C (-4° ~ 158°F) - Humidity : 10% ~ 90% non-condensing	
Dimensions	442 x 185 x 44 mm (17.40 x 7.28 x 1.73 inches)	